

CLAIMS

1. A cold stocker that uses a Stirling refrigerating engine to cool a compartment thereof, wherein

heat of a warm section of the Stirling engine is transferred to a refrigerant in a gas-liquid two-phase condition so as to be used for at least one of tasks of promoting evaporation in drainage, preventing dew condensation on a cold stocker wall, and defrosting of a compartment-cooling heat exchanger.

2. A cold stocker that uses a Stirling refrigerating engine to cool a compartment thereof, wherein

there are formed:

a first warm-side refrigerant circulation circuit for dissipating heat of a warm section of the Stirling engine outside the cold stocker; and

a second warm-side refrigerant circulation circuit for using the heat of the warm section for at least one of tasks of promoting evaporation in drainage, preventing dew condensation on a cold stocker wall, and defrosting of a compartment-cooling heat exchanger.

3. The cold stocker of the claim 2,

wherein

the first warm-side refrigerant circulation circuit and the second warm-side circulation circuit are designed to be independent of each other.

4. The cold stocker of claim 3,

wherein

in the first warm-side refrigerant circulation circuit, the refrigerant is allowed to circulate naturally, and

in the second warm-side refrigerant circulation circuit, the refrigerant is made to circulate

forcibly.

5. A cold stocker that uses a Stirling refrigerating engine to cool a compartment thereof, comprising:

a warm-side heat exchanger arranged in a warm section of the Stirling refrigerating engine;

a heat-dissipating heat exchanger for dissipating heat into an environment outside the cold stocker;

a first warm-side refrigerant circulation circuit that is built as a loop thermosyphon formed between the warm-side heat exchanger and the heat-dissipating heat exchanger;

a second warm-side refrigerant circulation circuit that uses heat of the warm section for at least one of tasks of promoting evaporation in drainage, preventing dew condensation on a cold stocker wall, and defrosting of a compartment-cooling heat exchanger; and

a circulation pump for pumping out refrigerant in the warm-side heat exchanger into the second warm-side refrigerant circulation circuit.

6. A cold stocker that uses a Stirling refrigerating engine to cool a compartment thereof, wherein

there are formed:

a first warm-side refrigerant circulation circuit through which heat of a warm section of the Stirling refrigerating engine is dissipated outside the cold stocker; and

a second warm-side refrigerant circulation circuit that uses heat of the warm section for at least one of tasks of promoting evaporation in drainage, preventing dew condensation on a cold stocker wall, and defrosting of a compartment-cooling heat exchanger, and

the first warm-side refrigerant circulation circuit and the second warm-side refrigerant circulation circuit are both connected, in parallel with each other, to a common warm-side heat exchanger arranged in the warm section.

7. The cold stocker of claim 6,

wherein

a plurality of the warm-side heat exchangers are arranged, and

the first warm-side refrigerant circulation circuit and the second warm-side refrigerant circulation circuit are connected in parallel with each of the plurality of the warm-side heat exchangers.

8. The cold stocker of claim 5, wherein

a flow-back refrigerant pipe of the first warm-side refrigerant circulation circuit is connected to an inlet side of the circulation pump.

9. The cold stocker of one of claims 2 to 8, wherein

a refrigerant is used in gas-liquid two-phase in one of or both of the first and second warm-side refrigerant circulation circuits.

10. A cold stocker that uses a Stirling refrigerating engine to cool a compartment thereof, wherein

a heat exchange portion provided for promoting evaporation in drainage and a heat exchange portion provided for preventing dew condensation on a cold stocker wall are connected in parallel with each other, and

this parallel connection configuration is connected in series with a heat exchanger provided in a warm section of the Stirling refrigerating engine so as to form a warm-side refrigerant circulation circuit.

11. A cold stocker that uses a Stirling refrigerating engine to cool a compartment thereof, wherein

a heat exchanger provided in a warm section of the Stirling refrigerating engine, a heat exchange portion provided for promoting evaporation in drainage, and a heat exchange

portion provided for preventing dew condensation on a cold stocker wall are connected in series so as to form a warm-side refrigerant circulation circuit.

12. A cold stocker of one of claims 1 to 8, 10, and 11, wherein a cold-side refrigerant circulation circuit is formed so as to comprise a heat exchanger arranged in a cold section of the Stirling refrigerating engine and a compartment-cooling heat exchanger,

a heat exchange portion for defrosting is provided so as to face the compartment-cooling heat exchanger, and

a warm-side refrigerant circulation circuit is formed so as to comprise the heat exchange portion for defrosting and the heat exchanger provided in a warm section of the Stirling refrigerating engine.

13. A cold stocker of claim 12, wherein

a heat storage portion is formed in the warm-side refrigerant circulation circuit that comprises the heat exchange portion for defrosting and the heat exchanger disposed in a warm section of the Stirling refrigerating engine.

14. A cold stocker of claim 9, wherein

a cold-side refrigerant circulation circuit is formed so as to comprise a heat exchanger provided in a cold section of the Stirling refrigerating engine and a compartment-cooling heat exchanger,

a heat exchange portion for defrosting is provided so as to face the compartment-cooling heat exchanger, and

a warm-side refrigerant circulation circuit is formed so as to comprise the heat exchange portion for defrosting and the heat exchanger provided in a warm section of the Stirling refrigerating engine.

15. The cold stocker of claim 14, wherein

a heat storage portion is formed in the warm-side refrigerant circulation circuit that comprises the heat exchange portion for defrosting and the heat exchanger provided in a warm section of the Stirling refrigerating engine.